

EAST HOOD CANAL COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

The East Hood Canal coastal cutthroat stock complex has been identified as distinct based on the geographic distribution of its spawning grounds. This stock complex is composed of coastal cutthroat trout in drainages flowing from the Kitsap Peninsula into Hood Canal and in independent tributaries to Hood Canal south of the Union River. Moving from north to south on the Kitsap Peninsula, drainages include several unnamed tributaries, Jump Off Joe Creek, Little Anderson Creek, Big Beef Creek, Little Beef Creek, Seabeck Creek, Stavis Creek, Boyce Creek, Anderson Creek, Dewatto River, Tahuya River, Shoofly Creek, Stimson Creek, Big and Little Mission creeks, and the Union River. Independent tributaries south of the Union River include Twanoh Creek, Alderbrook Creek and several unnamed tributaries. The streams and rivers in this area are typical lowland type streams with generally low to moderate gradients. Many of these streams originate from lakes, ground water run-off, or swamp-like basins. The marine waters of Hood Canal are unique due to the slow exchange and mixing of waters in the extensive length of the canal. Depths generally exceed 90 meters (300 feet) with large areas in the 127 meter (420 feet) and deeper range. There are also shallow shelves and bays that provide warmer water rich in nutrients. Since anadromous cutthroat do not generally cross deep bodies of water, but follow shoreline areas, the East Hood Canal stock complex has been separated from the West Hood Canal stock complex.

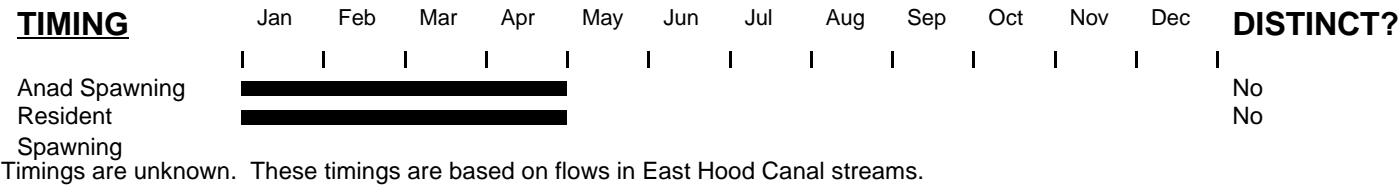
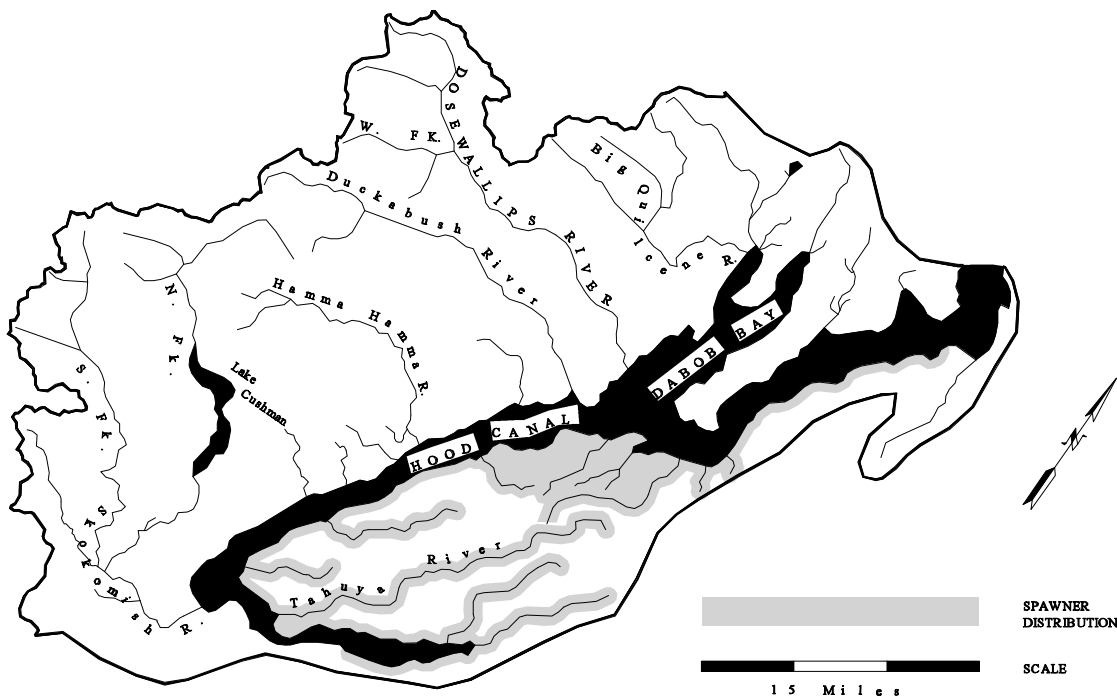
Anadromous and resident cutthroat are present in the East Hood Canal stock complex. McKenna Falls on the Union River is the only known natural barrier to anadromous cutthroat migration for this stock complex. Resident cutthroat are likely present upstream of McKenna Falls. Coastal cutthroat utilize lowland lakes and beaver ponds which are present in this area, but we do not know if there are fluvial or adfluvial forms of coastal cutthroat in this stock complex. Specific spawn timing is unknown but is probably from January through April for all East Hood Canal life history forms.

Wild coastal cutthroat in this stock complex are native and sustained by wild production. Greater or fewer numbers of distinct spawning populations may be identified once comprehensive genetic, life history, and ecological information is available. There is some information which suggests that coastal cutthroat in Hood Canal are genetically distinct. Campton (1981) and Campton and Utter (1987) concluded that anadromous cutthroat inhabiting the Hood Canal and north Puget Sound regions represent two genetically divergent stock complexes which probably reflect a long-term absence of gene flow between these two regions of Puget Sound. In the East Hood Canal stock complex, samples have recently been collected for genetic analysis from Big Beef, Seabeck, Stavis, Gold, Little Anderson, Stimson, Little Mission, Big Mission, unnamed

STOCK DEFINITION PROFILE for East Hood Canal Coastal Cutthroat

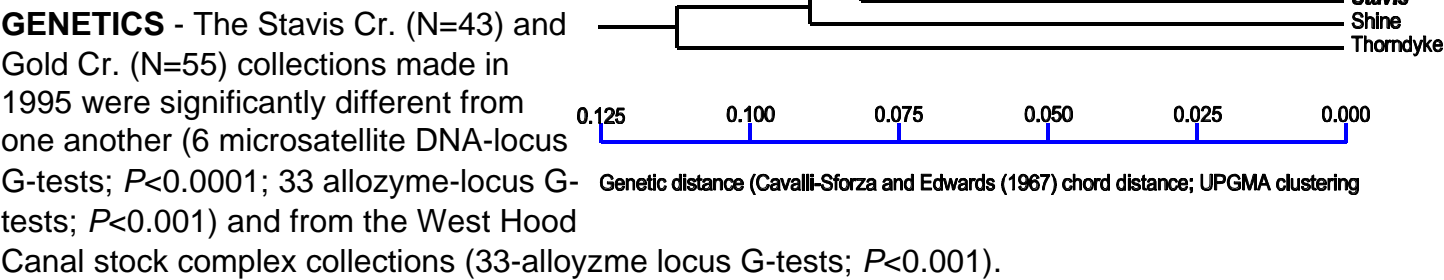
SPAWNER DISTRIBUTION

DISTINCT? - YES



BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

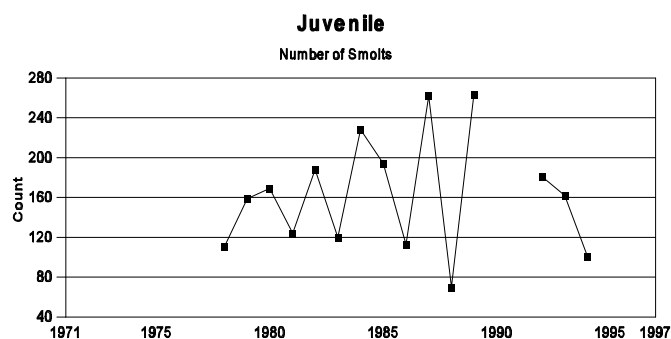
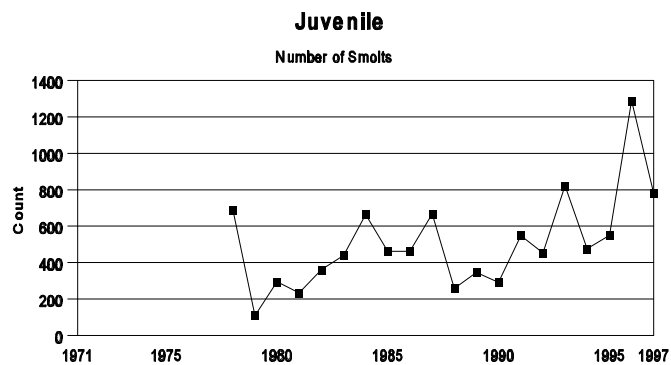


STOCK STATUS PROFILE for East Hood Canal Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Good

Return Years	JUVENILE Smolts	JUVENILE Smolts	JUVENILE Smolts	JUVENILE Smolts
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978	691	111		308
1979	110	159		287
1980	294	169		207
1981	233	124		120
1982	361	188	539	233
1983	440	120	887	115
1984	664	228	936	254
1985	462	194	556	244
1986	462	113	159	56
1987	668	262	562	68
1988	259	70	533	64
1989	347	263	311	54
1990	292			
1991	548			
1992	453	181	505	24
1993	823	162	502	355
1994	476	101	180	158
1995	549			
1996	1,289			
1997	780			



Col. 1 Big Beef Cr; Col. 2 Little Tahuya Cr,
Col. 3 Big Mission Cr; Col. 4 Bear Cr.

AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

stream 15.0498 (Big Mission Creek tributary), unnamed streams 15.0504 and 15.0507, Courtney and Bear creeks (Union River tributaries). Collections used for allozyme analysis included only Stavis and Gold creeks; the rest were taken for DNA analysis. The Stavis Creek and Gold Creek collections were genetically distinct from each other and from collections from the West Hood Canal stock complex.

STOCK STATUS

The status of the East Hood Canal coastal cutthroat stock complex is Unknown. Long-term monitoring information was deemed inadequate to assess the status of this coastal cutthroat stock complex.

Recent anadromous cutthroat smolt abundance information for Hood Canal tributaries is available from outmigrant trapping activities on Big Beef, Little Tahuya, Big Mission, Courtney, Bear, Little Anderson, Seabeck, and Stavis creeks (see Table 1). In Big Beef Creek, it appears that freshwater production of coastal cutthroat smolts has remained relatively stable or is increasing. Further, the ratio of cutthroat smolts to steelhead smolts has also remained relatively stable, suggesting that the community composed of these sympatric species has continued to successfully reproduce in the available freshwater habitat (Leider 1997). In addition, although quantitative data useful for trend analysis are limited, cutthroat were found to be abundant in a variety of streams during the course of recent genetic investigations from 1993 to 1995.

Table 1. Summary of cutthroat trout (CT), steelhead (SH), and coho salmon smolt abundance from outmigrating trapping on tributaries to Hood Canal, 1978 through 1997. Data collected by WDFW except 1992 through 1994 data for Little Tahuya, Big Mission, Courtney and Bear creeks collected by Point No Point Treaty Council.

Year	Big Beef Creek (15-0389) ^a			Little Tahuya Creek (15-0454) ^a			Big Mission Creek (15-0495) ^a			Courtney Creek (15-0505) ^a			Bear Creek (15-0510) ^a		
	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts
1978	691	881	17619	111	154	5560	-	-	-	220	42	1147	308	11	571
1979	110	870	45634	159	15	9772	-	-	-	197	9	1130	287	11	604
1980	294	1685	20715	169	97	3748	-	-	-	188	51	1034	207	36	439
1981	233	1578	41054	124	48	9042	461	567	19023	130	24	1436	120	14	508
1982	361	1269	25225	188	116	9615	539	732	15218	171	40	1165	233	31	816
1983	440	1237	25333	120	77	7278	887	614	18716	163	72	1507	115	33	801
1984	664	1770	36636	228	146	10228	936	591	17011	308	130	1039	254	26	251
1985	462	1189	25720	194	85	11027	556	512	15770	187	53	1451	244	10	755
1986	462	1210	24479	113	26	4448	159	143	7318	179	36	1415	56	8	667
1987	668	1153	11510	262	161	1357	562	500	7091	33	37	238	68	13	112
1988	259	990	26534	70	63	2735	533	645	14528	62	27	1483	64	5	636
1989	347	1284	17594	263	200	7761	311	377	13906	110	71	1460	54	3	992
1990	292	1597	19565	-	-	-	-	-	-	-	-	-	-	-	-
1991	548	1089	23646	-	-	-	-	-	-	-	-	-	-	-	-
1992	453	1595	18677	181	449	5946	505	369	18107	66	65	1755	24	13	538
1993	823	1181	13071	162	56	3873	502	424	13010	167	59	1234	355	13	413
1994	476	1592	18431	101	44	3117	180	224	15548	65	15	1041	158	7	138
1995	549	1311	16207												
1996	1289	1417	25242												
1997	780	1289	40830												

^a WRIA-Stream no.

Table 1 (cont.). Summary of cutthroat trout (CT), steelhead (SH), and coho salmon smolt abundance from outmigrating trapping on tributaries to Hood Canal, 1978 through 1997. Data collected by WDFW except 1992 through 1994 data for Little Tahuya, Big Mission, Courtney and Bear creeks collected by Point No Point Treaty Council (cont.).

Year	Little Anderson Creek (15-0377) ^a			Seabeck Creek (15-0400) ^a			Stavis Creek (15-0404) ^a		
	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts	CT Smolts	SH Smolts	Coho Smolts
1992	625	11	404	--	--	--	--	--	--
1993	823	12	140	330	9	1284	624	4	3501
1994	61	1	151	139	20	2148	874	61	5851
1995	566	268	779	309	100	1326	1196	324	4385
1996	1540	43	343	705	53	866	1355	74	4690
1997	1124	3	100	417	10	1637	1664	34	8351

^a WRIA-Stream no.

An effort was made to sample systematically adult cutthroat in fisheries on Hood Canal. Volunteer anglers from the Sea-Run Cutthroat Coalition and associated sportsclubs, working with WDFW, participated in "fish-ins" on Hood Canal from 1989 to 1992. Each spring and fall, volunteer anglers collected data on size of cutthroat caught, catch per hour, and presence or absence of adipose fins. Hatchery cutthroat (identified by the absence of adipose fins) made up less than 10% of the total catch, and catch per hour was low for both hatchery and wild cutthroat. Long-term trends in abundance could not be determined, but standardized angling by volunteers and/or agency personnel can be valuable in helping assess the status of coastal cutthroat trout. Beginning in 1995 and continuing for five years, the Sea-Run Cutthroat Coalition plans to collect information on sea-run cutthroat in fisheries by volunteer anglers (Jauquet and Schorsch 1997).

Natural hybridization between coastal cutthroat and steelhead has been documented in Big Mission Creek in Hood Canal and in Harvey Creek, a tributary to the Stillaguamish River in North Puget Sound (Campton and Utter 1985; Hawkins 1997). Campton (1981) suggested that due to the lack of complete spatial and temporal reproductive isolation, the production of hybrid offspring may not be uncommon in streams where both species occur. While it is believed that present genetic profiles are similar to past populations for both cutthroat and steelhead, care should be taken to minimize potential interbreeding resulting from fish stocking.

FACTORS AFFECTING PRODUCTION

Habitat--Major limiting habitat factors include altered annual instream flow regimes and associated seasonal flooding and low summer flows, loss of access due to human-caused barriers, water quality and quantity problems in the areas of concentrated land development, degraded instream and riparian habitat, land conversions from forest to agricultural or residential use, and alternation and loss of wetlands and estuarine habitats (Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes 1994, Hood Canal Coordinating Council 1995).

Harvest Management--The trout season is open from June 1 through October 31 in streams, rivers and beaver ponds with a two-trout daily limit and an eight-inch minimum size limit to protect juveniles and resident spawners. Where adult anadromous fish and fisheries exist, regulations in freshwater allow a two-fish daily limit, with a 14-inch minimum size limit. This minimum size limit protects first-time spawners and some repeat spawners from harvest. In addition, catch-and-release regulations are in place to protect vulnerable wild cutthroat and steelhead populations.

Hatchery--Johnston and Mercer (1976) successfully developed a late-entry hatchery broodstock from wild anadromous cutthroat captured in Thorndyke and Dabob bays for use in Hood Canal. Between 1970 and 1991, hatchery anadromous cutthroat from this broodstock or other broodstocks were released directly into Hood Canal and into several East Hood Canal streams, including Big Mission Creek and the Dewatto, Tahuya, and Union rivers. Hatchery releases were discontinued in 1991 due to poor survival and failure to provide adequate recreational harvest on the returning anadromous cutthroat adults. No further releases of hatchery sea-run cutthroat are planned in this area. The late-entry broodstock is currently maintained at WDFW's Eells Springs Hatchery in the Skokomish River basin. About 1,500 catchable-sized fish and 100,000 fingerlings are released annually to provide a recreational fishery in Lake Cushman on the North Fork Skokomish River.

Resident cutthroat fry and catchable-sized cutthroat, originating from Tokul Creek (Snohomish River, north Puget Sound) hatchery stock, are annually released in numerous lakes and beaver ponds on the Kitsap Peninsula. The interaction between hatchery and wild cutthroat in these lakes and beaver ponds is believed to be very limited. Hatchery winter steelhead were released into various eastside Hood Canal tributaries, including the Tahuya and Union rivers. However, planting stopped in 1996 as a result of concerns over wild steelhead production. Future management plans are to continue with the no-release direction.

WEST HOOD CANAL COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

The West Hood Canal coastal cutthroat stock complex has been identified as distinct based on geographic distribution of its spawning grounds. This stock complex is composed of coastal cutthroat trout in drainages flowing into Hood Canal from the northeastern part of the Olympic Peninsula south to the Skokomish River. The larger drainages and rivers in this area (Skokomish, Hamma Hamma, Duckabush, Dosewallips, Big and Little Quilcene rivers) originate in steep Olympic Mountain terrain and have high to moderate gradients with flow input coming from glacier and snow melt. There are also numerous smaller drainages with lesser gradients that originate from lakes and ground-water runoff. From north to south, these drainages include Shine, Thorndyke, Tarboo, Donovan, McDonald, Fulton, Schaerer, Wacketickeh, Jorsted, Eagle, Lilliwaup, Sund, Miller, Clark, Finch and Hill creeks and numerous unnamed independent drainages.

The marine waters of Hood Canal are unique due to the slow exchange and mixing of waters in the extensive length of the canal. Depths generally exceed 100 meters. There are also shallow shelves and bays that provide warmer waters rich in nutrients (Williams et al. 1975). Since anadromous cutthroat do not generally cross deep bodies of water, but follow shoreline areas, the West Hood Canal stock complex has been separated from the East Hood Canal stock complex.

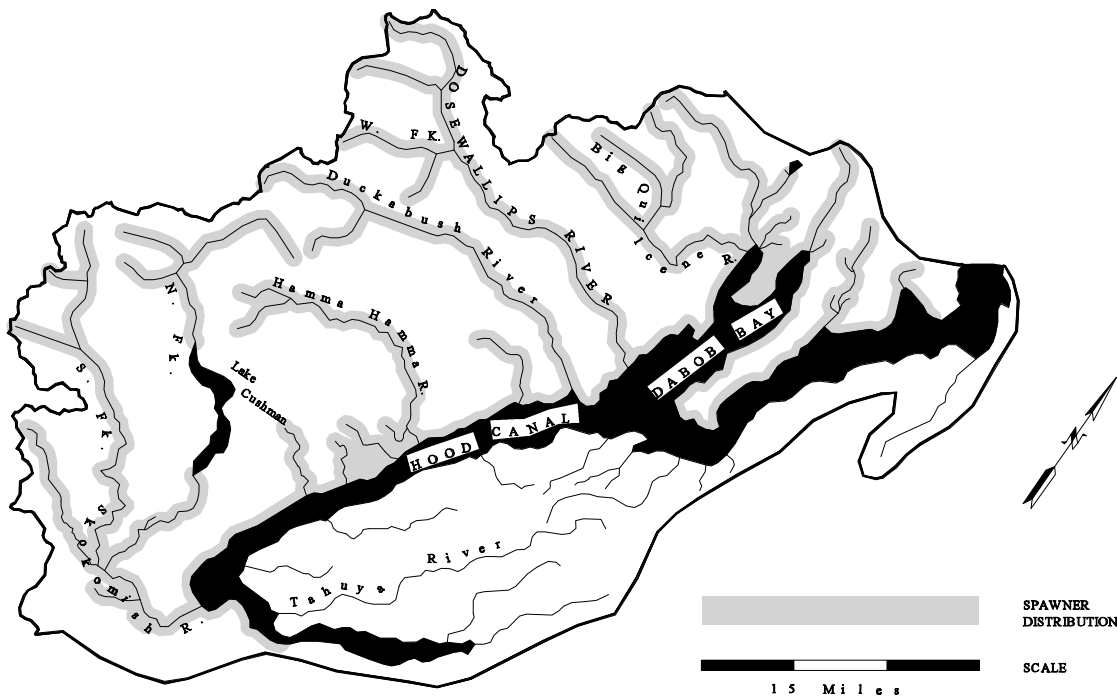
Anadromous and resident life history forms are present in the West Hood Canal stock complex. We do not know if fluvial or adfluvial forms of coastal cutthroat are also present in this stock. Specific spawn timing is unknown, but is probably from January through April for all West Hood Canal life history forms.

Wild coastal cutthroat in this stock complex are native and sustained by wild production. Greater or fewer numbers of distinct spawning populations may be identified once comprehensive genetic, life history, and ecological information is available. There is some information which suggests that coastal cutthroat in Hood Canal are genetically distinct. Campton (1981) and Campton and Utter (1987) concluded that anadromous cutthroat inhabiting the Hood Canal and north Puget Sound regions represent two genetically-diverged stock complexes which probably reflects a long-term absence of gene flow between these two regions of Puget Sound. In the West Hood Canal stock complex, coastal cutthroat samples have recently been collected for genetic analysis from Fulton, Howe, Tarboo, East Tarboo, Thorndyke, and Shine creeks. Samples from Thorndyke and Shine creeks were used for allozyme analysis and were genetically distinct from each other and from samples collected from the East Hood Canal stock complex; the rest were taken for DNA analysis.

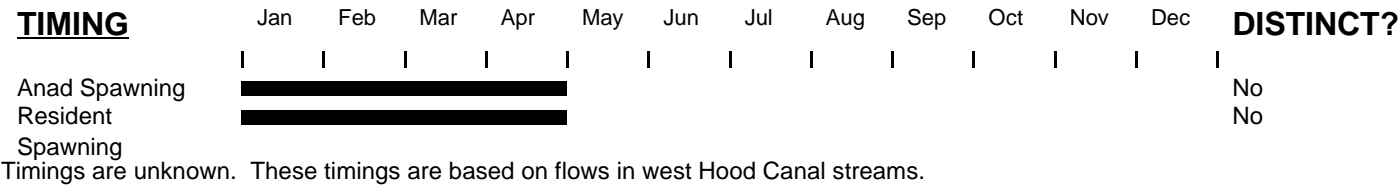
STOCK DEFINITION PROFILE for West Hood Canal Coastal Cutthroat

SPAWNWER DISTRIBUTION

DISTINCT? - YES



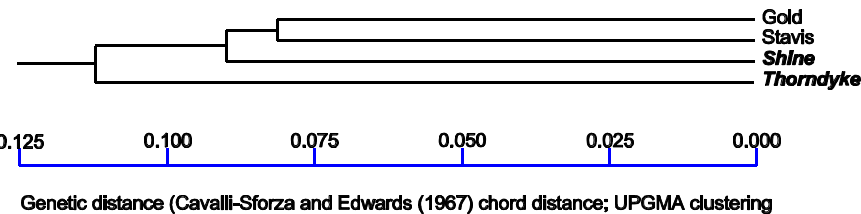
TIMING



BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

GENETICS - The Shine Cr. (N=58) and Thorndyke Cr. (N=57) collections, made in 1995, were significantly different from one another and from the East Hood Canal stock complex collections (33 allozyme-locus G-tests; $P<0.001$).



STOCK STATUS PROFILE for West Hood Canal Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> No Data

Return Years				
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AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

STOCK STATUS

The status of the West Hood Canal coastal cutthroat stock complex is Unknown. Although quantitative data useful for trend analysis are limited, coastal cutthroat were found to be abundant in drainages sampled during the course of recent genetic investigations from 1993 to 1995. In addition, juvenile abundance and presence/absence information is available from electrofishing in a variety of streams.

An effort was made to sample systematically adult cutthroat in fisheries on Hood Canal. Volunteer anglers from the Sea-Run Cutthroat Coalition and associated sports clubs, working with WDFW, participated in “fish-ins” on Hood Canal from 1989 to 1992. Each spring and fall, volunteer anglers collected data on size of cutthroat caught, catch per hour, and presence or absence of adipose fins. Hatchery cutthroat (identified by the absence of adipose fins) made up less than 10% of the total catch, and catch per hour was low for both hatchery and wild cutthroat. Long-term trends in abundance could not be determined, but standardized angling by volunteers and/or agency personnel can be valuable in helping assess the status of coastal cutthroat trout. Beginning in 1995 and continuing for five years, the Sea-Run Cutthroat Coalition plans to collect information on sea-run cutthroat in fisheries by volunteer anglers (Jauquet and Schorsch 1997).

Natural hybridization between coastal cutthroat and steelhead has been documented in Big Mission Creek in Hood Canal and in Harvey Creek, a tributary to the Stillaguamish River in North Puget Sound (Campton and Utter 1985, Hawkins 1997). Campton (1981) suggested that due to the lack of complete spatial and temporal isolation between spawning adults, the production of hybrid offspring may not be uncommon in drainages where both species occur. While the genetic integrity of these two species suggests that significant interbreeding has not occurred, care should be taken to minimize potential interbreeding resulting from fish stocking.

FACTORS AFFECTING PRODUCTION

Habitat--Major limiting habitat factors include altered annual instream flow regimes and associated seasonal flooding and low summer flows, loss of access due to human-caused barriers, water quality and quantity problems in the areas of concentrated land developments, degraded instream and riparian habitat, land conversions from forest to agricultural or residential use, and alteration and loss of wetlands and estuarine habitat (Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes 1994, Hood Canal Coordinating Council 1995). Some of the upper watersheds have been impacted by intensive logging, particularly the Skokomish River basin, however, much of the headwater areas are inside the Olympic National Park and are in pristine condition.

Harvest Management--The statewide general fishing season (June 1 through October 31) and standard regulations in streams, rivers, and beaver ponds (two fish per day, eight-inch minimum size limit), protect resident juveniles and migrating smolts from harvest. Where adult anadromous fish and fisheries exist, regulations in fresh and marine waters are catch-and-release. There is a tribal hook-and-line ceremonial and subsistence on the Skokomish River from late March through mid-August (six fish per day, 12-inch minimum size).

Hatchery--Johnston and Mercer (1976) successfully developed a late-entry hatchery broodstock from wild anadromous cutthroat captured in Thorndyke and Dabob bays for use in Hood Canal. From 1985 to 1987 many of the smolts were stocked in Hunter Creek, the outlet of the WDFW Eells Spring Hatchery on the Skokomish River, in an attempt to establish a returning broodstock.

Hatchery releases were discontinued in 1991 due to poor survival and failure to provide adequate recreational harvest on the returning anadromous cutthroat adults. Further releases of hatchery sea-run cutthroat are not planned in this area. This broodstock is currently maintained at WDFW's Eells Springs Hatchery, and about 1,500 catchable-sized fish and 100,000 fingerlings are released annually to provide a recreational fishery in Lake Cushman above Cushman Dam on the North Fork Skokomish River.

Resident cutthroat fry and catchable-size cutthroat, originating from Tokul Creek (Snohomish River, north Puget Sound) hatchery stock, are annually released in some lakes and beaver ponds in West Hood Canal drainages. The interaction between hatchery and wild cutthroat in these waters is believed to be very limited. Hatchery steelhead smolt releases continue in three systems, with annual releases of winter steelhead into the Skokomish (25,000), Duckabush (10,000) and Dosewallips (12,500) rivers.